



SIEMENS

Ingenuity for life

Fertilizers play a critical role in feeding the worlds population.



Fertilizer is usually made up of 3 main components nitrogen, phosphate, and potassium. These ingredients will be granulated and combined in a blending process. If you have ever noticed the bold numbers on a bag of fertilizer, those numbers indicate the amount of each component. For example, if the numbers are 18-24-4, the fertilizer is a blend containing 18% nitrogen, 24% phosphorus, and 4% potassium. This is known as the fertilizer's grade and amount of each component will always appear in this order. Some manufacturers will also add secondary nutrients and the balance is made up of a filler such as sand or granular limestone. A fertilizer production facility in the eastern United States uses volumetric belt feeders to blend the components of the fertilizer they produce.



SITRANS WM300 motion failure alarm controller provides reliable alarming directly to the plant's control room.

The Challenge

Volumetric belt feeders are designed to deliver a specific amount of material for a given belt speed. To do this, the depth of material on the belt feeder is fixed with a shear gate on the inlet of the feeder. If the speed of the belt is increased the rate of material transfer across the feeder will increase or if the belt speed of the feeder is decreased, the rate of material transfer will decrease. To run a batch of fertilizer the operator would set the speed of each feeder to a speed that would produce the desired blend. If the belt feeder slips on the drive pulley the friction from this slippage will generate heat which can damage the belt and left unattended this friction can generate enough heat to cause a fire. In addition to the maintenance and safety issues, this slippage will also affect the ratio of material being blending causing quality issues.

The Solution

The customer selected the WM300 MFA with two MSP7 Motion Sensing Probes and an analog output module. One probe monitors the speed of drive pulley and the other probe monitors the speed of a non-driven pulley. The WM300 MFA monitors the speed of each pulley and if it detects a difference in speed between the two pulleys indicating slippage, an alarm indication is given to the operator so the situation can be addressed. The WM300 MFA also provides an analog output to the control system. This analog signal is used by the control system to continuously adjust speed of the feeder to maintain the setpoint, automating the blending process. Siemens WM300 MFA and Motion Sensing Probes detect ferrous metal objects such as shaft keys as they pass near the probe. The versatility of the WM300 MFA allows it to be used on tail pulley shafts, driven pulleys, motor shafts, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps. It provides alarm outputs to indicate a slowdown in the equipment or a difference in speed between two components of a machine, it also provides an analog output to indicate the speed of the machine. The robust design of the Motion Sensing Probes allows them to be used in the harshest industrial environments.

Benefits

With the WM300 Motion Failure Alarm setup for differential speed detection, the customer has an early indication slippage is occurring on the drive pulley so that immediate action can be taken preventing long down time because a belt has to be replaced and improves the overall safety of the plant by reducing the risk of fire caused by heat generated by the belt slipping on the drive pulley. An additional benefit the customer was also able to improve the quality of the blend by using the optional analog output of the WM300 MFA to provide a feedback loop so the blending process can now be controlled in an automated process providing a more accurate blend reducing scrap product and increasing customer satisfaction.

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